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March 1, 1990

Mr Mike Milczarek
Department of Environmental Quality
2005 North Central Avenue
Phoenix, AZ 85004

Dear Mr. Milczarek:

In our meeting January 26, you asked that we send you a letter outlining: a) what is expected to happen to the residual cyanide in the heap during the detoxification period, b) if we could give you the number of pounds of cyanide that had escaped the system through leaks in the pad, and how we propose to check the degree of contamination from the leakage, c) the procedure for checking the residual free cyanide in the heaps, and d) what heap reclamation will be realized when the project is complete.

Jeanmarie also asked for some information from our past drilling program which has been sent to her.

To address your first request, some understanding of cyanide geochemistry is needed to realistically perceive the cyanide detoxification of our heap at the Vulture project. The following is an attempt to explain the effect of self-neutralization and the ephemeral nature of molecular hydrogen cyanide as it applies to our project. One of the difficulties in discussing cyanide and the environment is that the terminology used to describe cyanide species is confusing. To clarify cyanide terminology we need to realize the difference between free and total cyanide.

A.F. Budge (Mining) Limited

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FREE CYANIDE means the two species, ionic cyanide (CN-) and molecular hydrogen cyanide or hydrocyanic acid (HCN). In acidic and weakly-alkaline solutions, the dominant free cyanide species is molecular hydrogen cyanide. Most analytical techniques for measuring free cyanide involve solvent extraction or sparging the HCN from solution and measuring the HCN. The HCN is the dominant toxic species of concern and is usually reported as CN-. TOTAL CYANIDE refers to the sum, in terms of cyanide ion (CN-), of molecular hydrogen cyanide (HCN), cyanide ion (CN-), and most cyanide bound as metallic complexes and compounds. These metal-cyanide complexes are relatively to exceptionally stable.

One way to understand cyanide behavior in a decommissioned heap leach operation is to identify the cyanide reaction likely to take place, and the cyanide species likely to be present in the various geochemical environmental within the heap, the pad, and the underlying sediments and bedrock. Figure 1 is a schematic diagram of an abandoned heap system showing the major components of the system and the prevailing geochemical conditions within the heap environment. These conditions vary for different parts of the system. The upper portions of the system, including the heap itself, the pad, and the underlying weathered bedrock are likely to be oxidized, and relatively dry or at least unsaturated.

The natural degradation of cyanide occurs continuously in the heaps and eventually will return the heap material to an

environmentally acceptable condition. Several mechanisms exist for the destruction or loss of cyanide from the leach heaps. These include: 1) reaction with bacteria, 2) air and photo-decomposition, 3) hydrolysis, and 4) reaction with heap material.

1. BACTERIA

Cyanide contains two essential elements of life-carbon and nitrogen. Cyanide also has these elements combined in a high-energy state - the carbon to nitrogen bond. Cyanide is an ideal food source for bacteria. When cyanide is combined with oxygen, soda ash, and with minute quantities of phosphate, bacterial life may thrive. The destruction of cyanide by bacteria is complete. The cyanide is oxidized to carbon dioxide or carbohydrates and the nitrogen is converted to nitrogen or proteins.

2. AIR

The oxygen content of air can be an effective oxidant for cyanide. The oxidization reaction must be catalyzed. Various chemical compounds are catalysts, many of which may be present in the heap, such as activated carbon, iron oxide, manganese oxides, clays, zeolites, and active silica. Sunlight is also a good catalyst in the reaction of cyanide to oxygen. Cyanide on the surface of the heap or sprayed into the air will be oxidized by the oxygen in the air when exposed to ultraviolet radiation. The reaction of cyanide with air follows:

$$4NaCN + 5O + 2H_2O = 2N + 4CO + 4NaOH$$

3. HYDROLYSIS

Reaction between water and the cyanide ion (hydrolysis) results in the formation of molecular hydrogen cyanide (HCN). This reaction is very dependent on pH however, which takes place below pH of about 10.5. The pH of our heap will be much higher because the material was agglomerated with lime and cement. Following decommissioning and abandonment, there will be a gradual decrease in pH over time due to infiltration and carbon dioxide uptake. As the system pH falls, the HCN can be hydrolyzed to form formate, either formic acid (H.COOH) or ammonium formate (NH4.COOH). The system pH will determine the extent of formation of each compound, a lower pH favoring formic acid formation.

4. HEAP MATERIAL

There are a number of existing conditions in the heap to satisfy a naturally-occurring geochemical reaction within the heap environment which degrade HCN into less toxic or non-toxic compounds. The cyanide forms simple compounds with certain metals and thiocyanates with sulfur-containing species. Some of the metal cyanide compounds commonly found in a heap environment are listed on the following page.

RELATIVE STABILITY OF METAL CYANIDE COMPOUNDS AND COMPLEXES IN WATER (listed in approximate order of increasing stability):

CYANIDE SPECIES	EXAMPLES PRESENT IN HEAP
Free cyanide	CN-, HCN
Simple cyanide compounds:	
a) readily soluble	NaCN, KCN, Ca(CN) , HG(CN)
b) relatively soluble	Zn(CN) , CuCN, Ni(CN) , AgCN
Weak metal-cyanide complexes	Zn(CN)4 , Cd(CN) , Cd(CN)
Moderately strong metal-cyanide complexes	Cu(CN) , Cu(CN) , Ni(CN) Ag(CN)
Strong metal-cyanide complexes	Fe(CN) , Fe(CN) , Co(CN) Au(CN) , Hg(CN)

Cyanide can also react with metals to form metal-cyanide complexes. Metal-cyanide complex ions form as the products of the reaction between the insoluble cyanide compounds and excess cyanide ions. The following equation is an example of this reaction:

$$Zn(CN) + 2CN = Zn(CN)$$

Some of these metal-cyanide complexes are relatively to exceptionally stable.

Thiocyanate is a relatively stable and less toxic form of cyanide and an effective way of removing cyanide from the heap environment. Thiocyanate ions (CNS-) can be formed by the

reaction between cyanide and any sulfur species such as sulfide, hydrogen sulfide, or thiosulfate.

SUMMARY

The above discussion is an attempt to explain and define the numerous cyanide species which exist within a heap leach environment that are not highly toxic and are relatively stable complexes or compounds under most conditions. Some cyanide species, however, are not stable and react with the environment to produce HCN, the toxic form of cyanide. As we indicated, there are a number of naturally occurring geochemical reactions within the heap environment which degrade HCN into less toxic or non-toxic compounds. Thus with time, the heap environment tends to be self-neutralizing, and the HCN concentration will decrease to an environmentally acceptable level.

The natural detoxification process can be comparatively slow, but can be hastened by the recycling of barren solution through the heap, to effectively flush out any remaining cyanide. This is currently being done.

After a reasonable period of time, if the returning solution and the heap material do not meet the environmental standards as indicated in our permit, then chemical treatment may become necessary. The Degussa process, using hydrogen peroxide, is probably the most effective method of detoxification.

An estimate of the cyanide lost through the leaks is very difficult to determine. The amount of cyanide used for the

project was almost exactly as predicted by the metallurgical testing done prior to start-up. The test work done at the Dawson Metallurgical Laboratories, Inc. indicated that the cyanide consumption would average approximately 0.6 pounds of cyanide per ton of ore. The actual consumption was 0.67 pounds of cyanide per ton of ore. Because of the numerous variables, i.e. lag time in the return of solution, fluctuating points of solution application, indeterminate solution retention in the heaps, evaporation and natural degradation of cyanide, it is impossible to determine the amount of cyanide that may have escaped from the system.

After we have determined that the heaps have been detoxified and that they meet the limits specified in our permit, we will check the extent of any contamination under the pad by drilling two holes, one in front of each pad #1 & #2. A rotary drill rig would be driven on to the front of the two pads and an angled hole would be drilled to bed rock using air to recover the samples. Samples would be taken every three feet. Samples will be analysed by an acceptable lab for total and free cyanide and the drill holes will be grouted and sealed to prevent any solution from entering the sub-surface.

To leave the heaps in a more environmentally stable condition they would be graded off to achieve a more gradual slope and hydro-seeded to help prevent erosion.

Respectfully submitted,

Dale H. Allen
Production Manager for
A.F. Budge (Mining) Limited

SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

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August 2, 1988

A. F. Budge (Mining) Ltd.
7340 East Shoeman Lane
Suite 111-B (E)
Scottsdale, Arizona 85251-3335

SHB Job No. FC88-3796
Report No. 4

Re: Vulture Mine Heap Leach
15 Miles South of Wickenburg, Arizona

Gentlemen,

Transmitted herewith are the observations made during the final walk-through of the above referenced project on July 11, 12 and 13, 1988.

Should any questions arise concerning this report, please do not hesitate to call.

Respectfully submitted,
Sergent, Hauskins & Beckwith Engineers

By Albert C. Ruckman
Albert C. Ruckman, P. E.

Copies: Addressee (2)

SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

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DAILY PROGRESS REPORT

Job No. FC88-3796 Report No. 34 Date July 11, 1988

Project Vulture Mine Heap Leach

Location 15 miles South of Wickenburg, Arizona

Client A. F. Budge (Mining) Ltd.

Contractor Maya

Superintendent Floyd Willett

Weather Sunny & Hot

Final walk-through on liner on leach pad area today. Also, the pregnant solution channel tie-in to pregnant pond.

HDPE liner on leach pad still has quite a few repairs left to be made. Field Liner Services was unable to make job today and will postpone line repairs and walk-through until tomorrow. However, the channel tie-in to the pregnant pond looks good with a 100 mil HDPE splash pad used instead of 80 mil. This was all that they had in stock.

SHB Representative Daniel R. Lewis

SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

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DAILY PROGRESS REPORT

Job No. FC88-3796 Report No. 35 Date July 12, 1988

Project Vulture Mine Heap Leach

Location 15 miles South of Wickenburg, Arizona

Client A. F. Budge (Mining) Ltd.

Contractor Maya

Superintendent Floyd Willett

Weather Sunny and warm

Met with Larry Gutierrez of Field Liner Services and walked leach pad and repaired all visible leaks using the extruder. Walked the channel diversion area with Floyd and found the riprap in satisfactory condition. Channel looks good.

SHB Representative Daniel R. Lewis

SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

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DAVID E. PETERSON, P.G.
ALBERT C. RUCKMAN, P.E.
PAUL KAPLAN, P.E.

DAILY PROGRESS REPORT

Job No. FC88-3796 Report No. 36 Date July 13, 1988

Project Vulture Mine Heap Leach

Location 15 miles South of Wickenburg, Arizona

Client A. F. Budge (Mining) Ltd.

Contractor Maya

Superintendent Floyd Willett

Weather Sunny and warm

Met with Floyd Willett and Nick LaFronz and went over final drainage. It was decided that the drainage would be best addressed when Budge has everything in its place before proper drainage protection could be done.

Nick gave his final approval on project.

SHB Representative Daniel R. Lewis

SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS
SOIL & FOUNDATION ENGINEERING • ENGINEERING GEOLOGY • HYDROGEOLOGY
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October 30, 1989

Arizona Department of
Environmental Quality
Water Permits Unit
Room 202
2005 North Central Avenue
Phoenix, Arizona 85004

SHB Job No. E89-217
Letter No. 1

Attention: Ms. Abigail Myers
Water Permit Writer

Re: Consulting Services
Heap Leach Facility
Vulture Mine Project
Approximately 7 Miles South
of Wickenburg, Arizona

Ladies and Gentlemen:

This letter is submitted on behalf of A.F. Budge (Mining) Limited (Budge) in response to the notification of violations of Groundwater Quality Protection Permit G-0090-07 at the above referenced project. The letter of notification, dated September 26, 1989, was prepared by Mr. Michael A. Milczarek, Groundwater Permit Writer for the Arizona Department of Environmental Quality (DEQ), and included a September 15, 1989 site visit report (dated September 25, 1989) and a DEQ internal memorandum (dated September 26, 1989). Subsequent sections of this letter present our understanding of the conditions at the project facility and our responses to the DEQ requests.

1. Site Visit

A site visit was conducted by the writer on October 4, 1989, in order to review existing conditions at the heap leach facility and collect the data necessary to develop

recommendations. Subsequent to the site visit, a meeting involving Ms. Carole O'Brien and Mr. Dale Allen of Budge and the writer was held on October 20, 1989.

2. Leakage Through Heap Leach Pad Geomembrane Liner

Leach solution was originally detected in the cell no. 2 leak detection system riser pipe, located at the southeast corner of the pad cell, on August 7, 1989. The attached Figure 1 presents a plan view of the heap leach facility. The leakage rate was initially estimated at about 0.0013 gallons per minute (gpm), and tests on the fluid performed by Budge personnel indicated a pH of 11.1 and a free cyanide concentration of 250 milligrams per liter (mg/l). In accordance with the requirements of Parts II.A.4, II.B.1.b and II.C.1 of Groundwater Quality Protection Permit No. G-0090-07, this initial leak was reported to the DEQ and the Maricopa County Health Department in our letter of August 10, 1989.

Table 1 presents the results of leakage flow rate measurements and laboratory testing performed by Budge personnel for fluid encountered in the cell no. 2 leak detection system. As indicated in the table, prior to September 8, 1989, the leakage flow rate was roughly estimated. After September 8, a dedicated "Flexflo" pump was used for fluid extraction and leakage flow rate estimation.

Application of leach solution to the south half of cell nos. 1, 2 and 3 (the heap no. 3 area as presented in Figure 1) was discontinued on September 22, 1989. As can be seen in Table 1, as of October 17, 1989, the leakage flow rate had generally decreased from an upper limit of 0.04 gpm to 0.01 gpm, with minor fluctuations in mid-September, 1989. The free cyanide concentration and pH also decreased from highs of 300 mg/l and 11.7 to 50 mg/l and 8.3, respectively.

On September 21, 1989, leach solution was detected in the cell no. 1 leak detection system riser pipe. The collected fluid had a cyanide concentration of 250 mg/l and a pH of 7.8; no estimate of the leakage flow rate was made. Table 2 presents the Budge monitoring records for the cell no. 1 leak detection system. As indicated in this table, a dedicated "Flexflo" pump was installed in the cell no. 1 riser pipe on October 4, 1989. Over the period of October 5 to October 17, 1989, the leakage flow rate from cell no. 1 has decreased from 0.013 to 0.007 gpm, accompanied by decreases in the cyanide concentration and the pH. Collected fluid from the leak detection system riser pipes at cell nos. 1 and 2 is presently being pumped to the existing pregnant solution pond.

It is our understanding that leaching activities on cell nos. 1 & 2 are complete, and that no additional leach

solution will be applied to these cells. It is also understood that all project leaching operations will be completed in about 6 months.

3. Location of Leaks in Leach Pad Geomembrane Liner

Based on our understanding of the operations and conditions at the heap leach facility, it is anticipated that the leaks through the 30-mil thickness high density polyethylene (HDPE) geomembrane pad liner are most likely in the form of pinholes beneath the sand and gravel overliner material at the toe of cell nos. 1 and 2 (Figure 1). Other than physically removing the overliner material and vacuum testing the suspected damaged liner area, there are no reliable methods for identifying defects in an in-place geomembrane liner. It is our opinion that, given the cessation of leach solution application to cell nos. 1 and 2 and the anticipated remaining 6-month project life, it would be of no productive use to attempt to remove the overliner material and repair the suspected defects. It is felt that any repair attempts would most likely result in more damage to the liner from the hand labor necesary to expose the liner than presently exists.

It is anticipated that the leakage flow rate, cyanide concentration and pH will continue to decrease as excess

leach solution drains from heaps 1 and 3 on the south half of cell nos. 1 and 2 and no additional solution is applied to these areas.

As requested by DEQ, results of bonded seam strength and peel adhesion tests, performed by Precision Laboratories on samples of the heap leach pad liner field seams, are attached. Daily progress reports covering the vacuum testing of the entire length of all field seams are available upon request.

4. Hydrogeology of Site Area

The heap leach facility site area lies within the upper portion of the Hassayampa River basin, which extends from the Date Creek, Weaver and Bradshaw Mountains north of Wickenburg to the confluence with the Salt River near Phoenix, covering a total area of about 1,300 square miles.

Groundwater conditions in this area are discussed in detail in a report by Sanger and Appel (1980).* The report includes data on groundwater depths and water quality from numerous wells in the region, including the Vulture Mine well discussed below. The report also delineates the limits of several groundwater basins within the Hassayampa River drainage system.

*References are listed at the end of this letter.

The Vulture Mountains are flanked on the south by a deep alluvial basin referred to as the Hassayampa Plain. This area receives recharge, primarily in the form of groundwater, from the southern slopes of the Vulture Mountains, including the site area. The general flow direction of groundwater beneath the site is therefore to the south. Groundwater occurs in saturated alluvial materials at elevations ranging from about 1250 to 1500 feet in the Hassayampa Plain.

The static water table at the site is reported by Sanger and Appel to lie at an elevation of about 1645 feet above sea level, at an average depth of about 435 feet below the ground surface. Table 3 presents static water levels and water surface elevations for two wells and a mine decline in the vicinity of the site. The depths to water as presented in the table are consistent with the data reported by Sanger and Appel.

It is expected that the extent of contamination beneath the leach pad is limited to the upper few feet of sub-grade soils underlying the southern end of cell nos. 1 and 2. Groundwater at the site evidently only occurs at significant depths in bedrock, generally at about 400 feet. Thus, infiltration of the contaminants to the water table from the leach pad is not likely to occur, unless the contaminants are introduced via underground mine workings.

5. Sampling & Laboratory Analysis of Collected Leaking Fluid & Mine Water Well

It is our understanding that Budge personnel are presently engaged in recovering water samples from the cell no. 1 and 2 leak detection riser pipes and the Vulture Mine well for purposes of water quality testing as requested by the DEQ. It is further understood that appropriate sampling techniques and a certified laboratory experienced in Environmental Protection Agency-approved analytical procedures will be utilized. It is anticipated that the results of these tests will be submitted to the DEQ as soon as they become available.

6. Existing Slopes of Heaps

The existing leach pile height is about 30 feet, comprised of two 15-foot lifts. The individual 15-foot lifts are numbered as shown in Figure 1. The separation between the north and south heaps as shown in Figure 1 was purposely maintained during stacking of the tailings on the leach pad in order to provide some independence between the north and south halves. Four to six corrugated, perforated drainage pipes per cell are located on the pad liner, immediately beneath heaps 1 and 2. These pipes function to keep the solution head in the heaps at a low level by augmenting the drainage of the heaped tailings.

The existing exterior slopes of the heaps at the facility are in the range of 1.15:1 to 1.73:1 (horizontal to vertical), based on measurements by Budge personnel; a seismic setback between the lower and upper lifts is not provided. The angle of repose of the tailings was originally estimated to be about 1.73:1, with an anticipated maximum pile height of 75 feet. In the original facility design, 5-foot seismic setbacks were included for each 15-foot lift, because of the 75-foot pile height. Details of the original facility design can be found in our Geotechnical Design Development Report (SHB, 1987). It should also be noted that the maximum allowable pile height in the facility permit is 45 feet.

As depicted in Figure 1, a 20-mil thickness HDPE geomembrane liner panel was placed on the crest of heap no. 2, prior to stacking the heap no. 4 lift. This liner panel was placed by Budge personnel in an attempt to confine the leach solution to the upper (heap no. 4) lift, preventing releaching of the spent heap no. 2 tailings. It is our understanding that during leaching of heap no. 4, a leach solution line located at the southeast corner of the crest of heap no. 4 failed, resulting in inundation of that portion of the heap. Aided by the low basal frictional resistance caused by the underlying geomembrane liner, the saturated tailings slope then failed.

It is our opinion that the slopes of the heaps as presently configured are in a stable condition, except as noted below. During stacking of the tailings, the slopes assumed angles of repose particular to the materials involved. As discussed previously, the existing slopes are in the range of 1.15:1 to 1.73:1, yielding angles of repose of about 30 to 41 degrees. This range in slope angles is both typical and reasonable for the heaped tailings. It is felt that, for the 30-foot pile height involved, a seismic setback between lifts is not necessary. Because of the underlying liner panel, it is anticipated that localized failures of the heap no. 4 slope may occur in areas that become overly wetted by leach solution; however, it is expected that such failures will be of insufficient extent to restrict the solution channel or extend over the perimeter berm.

7. Leach Pad Perimeter Berm

The leach pad perimeter berms along the east, west and north sides of the pad were designed and constructed to a height of 2 feet. Within certain areas of the pad perimeter, the effective height of the perimeter berm has been reduced due to the placement of about 1 foot of tailings on the interior of the berm. It is our understanding that Budge personnel plan to relocate these

excess tailings to the main pile area, increasing the effective containment height of the perimeter berm to its original dimension.

Based on conversations with Budge personnel, it is our understanding that the "white residue...present on the soil of the southernmost furrow indicating leachate solution had breached that (perimeter) berm" on the southeast side of the pad was in fact not due to leach solution exiting the pad, but rather to a broken mine waterline. It is also our understanding, however, that Budge personnel are in the process of arranging for sampling and testing of the affected area for the presence of cyanide under DEQ supervision.

Should any questions arise concerning this letter, please do not hesitate to contact the undersigned.

Respectfully submitted,
Sergent, Hauskins & Beckwith Engineers

By _____
Nicholas J. LaFronz, P.E.

Reviewed by _____
Lawrence A. Hansen, Ph.D., P.E.

Copies: Addressee (1)
A.F. Budge (Mining) Limited
Attn: Ms. Carole A. O'Brien (2)

blc/bc-j14/10-26-89

REFERENCES

Sanger, H.W. and Appel, C.L., 1980, Maps Showing Ground-Water Conditions in the Hassayampa Area, Maricopa and Yavapai Counties, Arizona - 1978, U.S. Geological Survey, Water Resources Investigations, Open-File Report 80-584, Tucson, Arizona, June.

Sergent, Hauskins & Beckwith, 1987, Geotechnical Design Development Report, Heap Leach Facility Design, Vulture Mine Project, Near Wickenburg, Arizona, SHB Job No. E87-11, April 10.

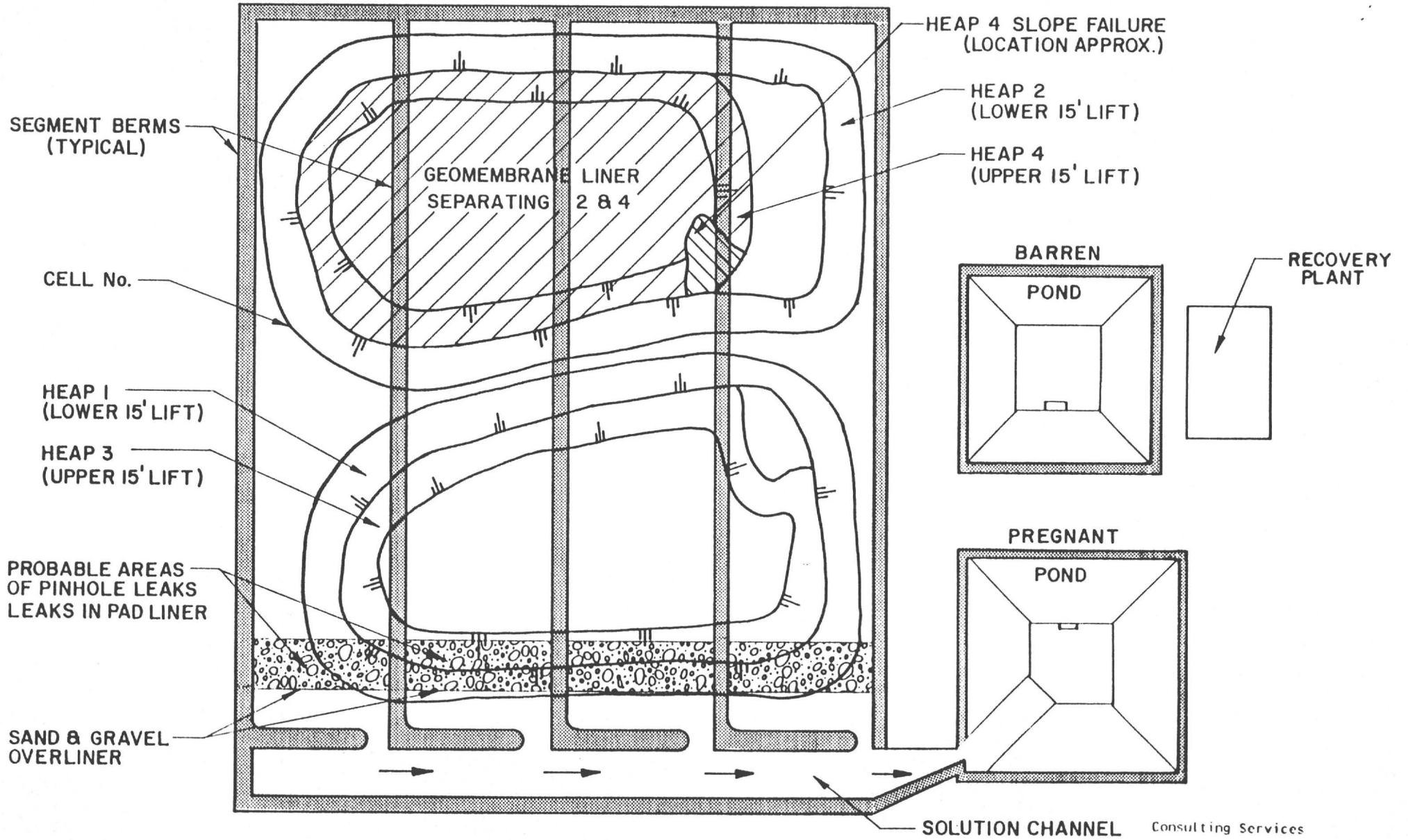

FIGURE 1

PLAN VIEW OF HEAP LEACH FACILITY

APPROX. SCALE: 1"=100'

Consulting Services
Heap Leach Facility
Vulture Mine Project
Approximately 7 Miles South
of Wickenburg, Arizona
SHB Job No. E89-217
Letter No. 1

SERGENT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

A.P Budge (Mining) Limited
Vulture Mine Project
Statistics on Leak in Detection Unit located on Cell # 2

Date	Time	Contained Cyanide				pH	Flowrate				
8-07-89	15:00	0.50	lb/ton	=	250 mg/l	11.1					
	20:10	0.50	lb/ton	=	250 mg/l	11.5					
8-08-89	24:00	0.60	lb/ton	=	300 mg/l	11.6					
	05:00	0.60	lb/ton	=	300 mg/l	11.5					
8-09-89	07:40	0.50	lb/ton	=	250 mg/l	11.5					
	19:20	0.50	lb/ton	=	250 mg/l	11.6					
	23:08	0.50	lb/ton	=	250 mg/l	11.5					
	03:28	0.50	lb/ton	=	250 mg/l	11.4					
8-10-89	11:00	0.50	lb/ton	=	250 mg/l	11.4					
	22:00	0.50	lb/ton	=	250 mg/l	11.4					
8-11-89	09:05	0.50	lb/ton	=	250 mg/l	11.4					
	13:00	0.50	lb/ton	=	250 mg/l	11.4					
8-14-89	10:00	0.50	lb/ton	=	250 mg/l	11.5					
	19:15	0.50	lb/ton	=	250 mg/l	11.4					
8-15-89	no samples taken										
8-16-89	08:00	0.50	lb/ton	=	250 mg/l	11.3					
	19:30	0.60	lb/ton	=	300 mg/l	11.4					
	02:12	0.50	lb/ton	=	250 mg/l	11.4	150	ml/min	estimated	0.040	gpm
8-17-89	11:20	0.40	lb/ton	=	200 mg/l	11.2					
	23:13	0.50	lb/ton	=	250 mg/l	11.3	150	ml/min	estimated	0.040	gpm
8-18-89	13:00	0.40	lb/ton	=	200 mg/l	11.3	150	ml/min	estimated	0.040	gpm
8-21-89	11:00	0.50	lb/ton	=	250 mg/l	11.8					
	19:16	0.50	lb/ton	=	250 mg/l	11.7					
8-22-89	09:00	0.50	lb/ton	=	250 mg/l	11.7	150	ml/min	estimated	0.040	gpm
8-23-89	09:32	0.50	lb/ton	=	250 mg/l	11.5					
	19:30	0.50	lb/ton	=	250 mg/l	11.6	150	ml/min	estimated	0.040	gpm
8-24-89	10:00	0.50	lb/ton	=	250 mg/l	11.8					
	23:00	0.50	lb/ton	=	250 mg/l	11.7	150	ml/min	estimated	0.040	gpm
8-25-89	09:00	0.50	lb/ton	=	250 mg/l	11.6	150	ml/min	estimated	0.040	gpm
8-28-89	12:00	0.50	lb/ton	=	250 mg/l	11.7					
	24:00	0.50	lb/ton	=	250 mg/l	11.6					
8-29-89	09:00	0.50	lb/ton	=	250 mg/l	11.7					
	13:30	0.50	lb/ton	=	250 mg/l	11.5					
	01:30	0.50	lb/ton	=	250 mg/l	11.4	150	ml/min	estimated	0.040	gpm
8-30-89	15:00	0.50	lb/ton	=	250 mg/l	11.4					
	01:15	0.50	lb/ton	=	250 mg/l	11.4	150	ml/min	estimated	0.040	gpm
8-31-89	07:00	0.40	lb/ton	=	200 mg/l	11.5	130	ml/min	estimated	0.034	gpm
9-01-89	08:30	0.50	lb/ton	=	250 mg/l	11.3	120	ml/min	estimated	0.032	gpm
9-05-89	07:30	0.50	lb/ton	=	250 mg/l	11.5					
	20:45	0.50	lb/ton	=	250 mg/l	11.5					
	02:10	0.50	lb/ton	=	250 mg/l	11.5	110	ml/min	estimated	0.029	gpm
9-06-89	09:15	0.50	lb/ton	=	250 mg/l	11.4					
	13:30	0.50	lb/ton	=	250 mg/l	11.4	100	ml/min	estimated	0.026	gpm
9-07-89	11:30	0.50	lb/ton	=	250 mg/l	11.7					
	01:15	0.50	lb/ton	=	250 mg/l	11.6	80	ml/min	estimated	0.021	gpm
9-08-89	INSTALLATION OF "FLEXFLO" PUMP										
	13:15	0.50	lb/ton	=	250 mg/l	11.0	50	ml/min	=	0.013	gpm
9-11-89	08:30	0.40	lb/ton	=	200 mg/l	10.9					

TABLE 1 (CONT.)

	21:45	0.50	lb/ton	=	250	mg/l	10.0	28	ml/min	=	0.007 gpm
9-12-89	10:00	0.40	lb/ton	=	200	mg/l	9.9				
	22:20	0.50	lb/ton	=	250	mg/l	9.9	27	ml/min	=	0.007 gpm
9-13-89	07:45	0.40	lb/ton	=	200	mg/l	9.9				
	20:40	0.50	lb/ton	=	250	mg/l	9.9	26	ml/min	=	0.007 gpm
9-14-89	07:30	0.40	lb/ton	=	200	mg/l	9.8	26	ml/min	=	0.007 gpm
9-15-89	07:15	0.40	lb/ton	=	200	mg/l	9.6	35	ml/min	=	0.009 gpm
9-19-89	07:00	0.40	lb/ton	=	200	mg/l	9.6	30	ml/min	=	0.008 gpm
9-20-89	09:15	0.40	lb/ton	=	200	mg/l	9.5	38	ml/min	=	0.010 gpm
9-21-89		0.40	lb/ton	=	200	mg/l	9.7				
9-22-89		0.40	lb/ton	=	200	mg/l	9.5				
9-25-89		0.30	lb/ton	=	150	mg/l	9.0				
9-26-89		0.30	lb/ton	=	150	mg/l	9.0	40	ml/min	=	0.011 gpm
9-27-89		0.30	lb/ton	=	150	mg/l	9.0	40	ml/min	=	0.011 gpm
9-28-89		0.30	lb/ton	=	150	mg/l	9.0	40	ml/min	=	0.011 gpm
9-29-89		0.20	lb/ton	=	100	mg/l	9.1	40	ml/min	=	0.011 gpm
10-02-89		0.20	lb/ton	=	100	mg/l	9.1	40	ml/min	=	0.011 gpm
10-03-89		0.20	lb/ton	=	100	mg/l	9.1	40	ml/min	=	0.011 gpm
10-04-89		0.20	lb/ton	=	100	mg/l	9.1	40	ml/min	=	0.011 gpm
10-05-89		0.20	lb/ton	=	100	mg/l	8.7	40	ml/min	=	0.011 gpm
10-06-89		0.20	lb/ton	=	100	mg/l	8.7	50	ml/min	=	0.013 gpm
10-09-89		0.15	lb/ton	=	75	mg/l	8.7	50	ml/min	=	0.013 gpm
10-10-89		0.15	lb/ton	=	75	mg/l	8.7	50	ml/min	=	0.013 gpm
10-11-89		0.15	lb/ton	=	75	mg/l	8.7	45	ml/min	=	0.012 gpm
10-12-89		0.15	lb/ton	=	75	mg/l	8.5	45	ml/min	=	0.012 gpm
10-16-89		0.10	lb/ton	=	50	mg/l	8.4	43	ml/min	=	0.011 gpm
10-17-89		0.10	lb/ton	=	50	mg/l	8.3	43	ml/min	=	0.011 gpm

A.P Budge (Mining) Limited
Vulture Mine Project

Statistics on Leak in Detection Unit on Cell # 1

Date	Contained Cyanide				pH	Flowrate			
9-21-89	0.50 lb/ton	=	250	mg/l	7.8				
9-22-89	0.50 lb/ton	=	250	mg/l	8.0				
9-25-89	0.50 lb/ton	=	250	mg/l	8.0				
9-26-89	0.50 lb/ton	=	250	mg/l	8.[illegible]				
10-04-89	INSTALLATION OF "FLEXFLO" PUMP								
10-05-89	0.40 lb/ton	=	200	mg/l	8.0	50 ml/min	=	0.013	gpm
10-06-89	0.40 lb/ton	=	200	mg/l	8.0	30 ml/min	=	0.008	gpm
10-09-89	0.40 lb/ton	=	200	mg/l	8.0	25 ml/min	=	0.007	gpm
10-10-89	0.40 lb/ton	=	200	mg/l	8.0	24 ml/min	=	0.006	gpm
10-11-89	0.40 lb/ton	=	200	mg/l	8.0	25 ml/min	=	0.007	gpm
10-12-89	0.40 lb/ton	=	200	mg/l	8.0	25 ml/min	=	0.007	gpm
10-16-89	0.35 lb/ton	=	175	mg/l	7.9	28 ml/min	=	0.007	gpm
10-17-89	0.35 lb/ton	=	175	mg/l	7.9	28 ml/min	=	0.007	gpm

TABLE 3

Summary of Static Groundwater Levels
Vicinity of Heap Leach Facility
Vulture Mine

Description	Location	Depth to Water (feet)	Water Surface Elevation (feet)
Vulture Mine Well	NW1/4 SW1/4 NW1/4 Sec. 31 T6N R5W	430	1635
Mine Decline (35 degrees)	NE1/4 NW1/4 SE1/4 Sec. 36 T6N R6W	376	1706
Private Well (David Smith, owner)	NW1/4 NW1/4 Sec 7 T5N R5W	500	1400

Precision Laboratories
11834 Western Avenue P.O. Box 915 Garden Grove California 92642-0915 (714) 891-7832

August 15, 1988

Mr. Nick La Fronz
Sergent, Hauskins & Beckwith
3232 W. Virginia
Phoenix, AZ 85009

Dear Mr. La Fronz:

Thank you for consulting Precision Laboratories for your material testing needs.

Enclosed please find the laboratory report for the testing of the polyethylene seams received August 2, 1988.

If you have any questions or if I may be of further service, please do not hesitate to call.

Sincerely,

PRECISION LABORATORIES

Lance S. Reed
Assistant Laboratory Manager

Enclosure

Precision Laboratories
11834 Western Avenue. P.O. Box 915. Garden Grove. California 92642-0915 (714) 891-7832

August 15, 1988

VERIFICATION OF MATERIAL PROPERTIES
Polyethylene Seams
For: Sergent, Hauskins & Beckwith
(Sergent, Hauskins & Beckwith Job No: E88-41 - Precision Reference: 88793)

INTRODUCTION

Precision Laboratories conducted physical testing on seven (7) polyethylene seams for Sergent, Hauskins & Beckwith of Phoenix, Arizona. The samples were identified as originating from Sergent, Hauskins & Beckwith's Vulture Mine project. The samples were further identified as *area 1, area 2, area 3, area 4, pad 7-8-88, barren pond 6-7-88* and *pregnant pond 6-9-88*. Delivery to the laboratory was made by United Parcel Service on August 2, 1988.

TEST PROCEDURES

The samples were tested for seam peel adhesion and bonded seam strength. Seam peel adhesion was determined in accordance with ASTM D413 as modified by the National Sanitation Foundation (NSF) Standard 54 using one inch wide specimens, an initial gage of 2 inches and a strain rate of 2 inches per minute. Bonded seam strength was determined in accordance with ASTM D3083 as modified by the National Sanitation Foundation Standard 54 using one inch wide specimens, an initial gage of 4 inches plus the width of the seam and a strain rate of 20 inches per minute.

TEST RESULTS

The test results are reported on Tables 1 through 5, attached. The units in which the data are reported are included on the tables. The break types are described as either film tearing bond (FTB) or peel (PEEL).

PRECISION LABORATORIES

Lance S. Reed

Lance S. Reed
Assistant Laboratory Manager

TABLE 1. MATERIAL PROPERTIES

Polyethylene Seams

For: Sergent, Hauskins & Beckwith

(Sergent, Hauskins & Beckwith Job No: E88-41 - Precision Reference: 88793)

AREA 1

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	73.0	FTB	37.5	FTB
	80.5	FTB	54.6	FTB
	75.1	FTB	32.9	FTB
	75.8	FTB	23.8	PEEL
	70.0	FTB	33.0	FTB
Avg:	74.9		36.4	
SD:	3.9		11.3	

AREA 2

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	77.1	FTB	51.3	FTB
	78.7	FTB	61.2	FTB
	73.2	FTB	56.6	FTB
	73.7	FTB	56.6	FTB
	75.8	FTB	61.6	FTB
Avg:	75.7		57.5	
SD:	2.3		4.2	

TABLE 2. MATERIAL PROPERTIES

Polyethylene Seams

For: Sergent, Hauskins & Beckwith

(Sergent, Hauskins & Beckwith Job No: E88-41 - Precision Reference: 88793)

AREA 3

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	89.3	FTB	60.0	FTB
	89.1	FTB	31.3	FTB
	89.2	FTB	52.0	FTB
	86.9	FTB	59.0	FTB
	89.1	FTB	50.3	FTB
Avg:	88.7		50.5	
SD:	1.0		11.5	

AREA 4

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	94.7	FTB	62.4	FTB
	93.3	FTB	71.4	FTB
	94.1	FTB	65.2	FTB
	93.7	FTB	58.0	FTB
	93.1	FTB	68.4	FTB
Avg:	93.8		65.1	
SD:	0.6		5.2	

TABLE 3. MATERIAL PROPERTIES

Polyethylene Seams

For: Sergent, Hauskins & Beckwith

(Sergent, Hauskins & Beckwith Job No: E88-41 - Precision Reference: 88793)

PAD 7-8-88

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	103	FTB	75.1	FTB
	103	FTB	71.8	FTB
	102	FTB	68.5	FTB
	102	FTB	66.2	FTB
	101	FTB	79.9	FTB
Avg:	102		72.3	
SD:	1		5.4	

BARREN POND 6-7-88

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	63.5	FTB	41.8	FTB
	61.4	FTB	40.7	FTB
	65.4	FTB	47.3	FTB
	65.2	FTB	44.1	FTB
	64.9	FTB	49.9	FTB
Avg:	64.1		44.8	
SD:	1.7		3.8	

TABLE 4. MATERIAL PROPERTIES

Polyethylene Seam

For: Sergent, Hauskins & Beckwith

(Sergent, Hauskins & Beckwith Job No: E88-41 - Precision Reference: 88793)

PREGNANT POND 6-9-88

	BONDED SEAM STRENGTH (lbs/inch-width)	BREAK TYPE	SEAM PEEL ADHESION (lbs/inch-width)	BREAK TYPE
	122	FTB	68.8	FTB
	124	FTB	79.2	FTB
	123	FTB	77.4	FTB
	122	FTB	84.8	FTB
	*		*	
Avg:	123		77.6	
SD:	1		6.6	

* Not tested due to insufficient material

TABLE 5. THICKNESS (MILS)

Polyethylene Seams

For: Sergent, Hauskins & Beckwith

(Sergent, Hauskins & Beckwith Job No: E88-41 - Precision Reference: 88793)

AREA 1

	TOP SHEET	BOTTOM SHEET
	27.0	29.3
	29.3	27.3
	27.0	28.4
Avg:	27.8	28.3
SD:	1.3	1.0

AREA 2

TOP SHEET	BOTTOM SHEET
32.0	30.5
36.7	30.3
39.2	31.0
36.0	30.6
3.7	0.4

AREA 3

	TOP SHEET	BOTTOM SHEET
	33.4	32.5
	33.2	33.1
	30.1	33.0
Avg:	32.2	32.9
SD:	1.9	0.3

AREA 4

TOP SHEET	BOTTOM SHEET
34.0	32.0
31.8	33.5
31.6	34.8
32.5	33.4
1.3	1.4

PAD 7-8-88

	TOP SHEET	BOTTOM SHEET
	37.1	38.0
	38.7	36.8
	35.4	38.6
Avg:	37.1	37.8
SD:	1.7	0.9

BARREN POND 6-7-88

TOP SHEET	BOTTOM SHEET
22.7	23.5
22.8	23.2
22.7	22.7
22.7	23.1
0.1	0.4

PREGNANT POND 6-9-88

	TOP SHEET	BOTTOM SHEET
	38.5	41.5
	39.2	41.4
	37.2	41.9
Avg:	38.3	41.6
SD:	1.0	0.3

Ron-FYI

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

ROSE MOFFORD, GOVERNOR
RANDOLPH WOOD, DIRECTOR

RECEIVED SEP 2 8 1989

September 26, 1989

Carole A. O'Brien
A.F. Budge Ltd.
7340 E. Shoeman Ln
Suite 111 "B" (E)
Scottsdale 85251

Dear Ms. O'Brien,

Attached is a copy of the site visit report which has been placed in your Groundwater Quality Protection Permit file and the inter-department memo regarding the steps to be taken on your leak problem.

We have determined that your facility is in violation of three permit conditions. Please initiate our recommendations to correct the three violations in accordance with the time schedule as stipulated. You will receive a letter from our compliance unit verifying the actions to be taken with regards to the leak. This is required as part of the contingency requirements. If the other two violations are not rectified within a timely manner, then our compliance unit will be directed to enforce those conditions.

Please forward all proposals regarding this issue to Abigail Myers at the department address. If you have any questions, feel free to call her at 257-6825.

Sincerely,

Michael A. Milczarek
Groundwater Permit Writer

cc: GWQPP G-0090-07 file

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Inter-Office Memorandum

DATE: September 25, 1989

TO: File, Groundwater Quality Protection Permit No. G-0090-07

THRU: Gary Ullinskey GMU
Roger Kennett RK

FROM: Michael Milczarek M.M.

RE: Site Visit Report
Vulture Mine Facility, September 15, 1989

SITE DESCRIPTION:

The Vulture Mine gold heap leaching facility, is located 7 miles west of Wickenburg on Vulture Mine Rd. The operation was permitted under Groundwater Quality Protection Permit (GWQPP) G-0090-07 on June 9, 1988 and has been operating at 100% capacity since the end of the Second Quarter Monitoring Report. Approximately 225,000 tons of gold ore are stacked on a heap leach pad which consists of a 30 mil HDPE liner over a 95% dry compacted subsurface. The heap leaching pad is separated into four "cells" of which each has a double lined (30 mil HDPE) leak detection system. The facility was visited on September 15, 1989 by Water Permit writers Abigail Myers and Mike Milczarek and Environmental Program Supervisor Gary Ullinskey. During the Site Visit, several violations of the GWQPP were observed.

1) LEACHATE LEAKAGE FROM THE HEAP LEACHING PAD

Cyanide leachate solution was observed in the leak detection system of the two most western cells. As required by the contingency requirements of Part II.C.1 of the permit, the operator, Mr. Dale Allen notified the Department by letter on August 10. The presence of leachate solution in the leak detection system is a violation of Part II.A.4. of the GPP.

2) IMPROPER STACKING OF THE GOLD ORE
The facility plans as specified in the permit stipulate a 1:1.75 slope of the heap, with 5 ft seismic setbacks for each 15 ft rise in elevation. The slope of the heap far exceeded that as specified and setbacks were not observed in a regular manner. This has led to operational "blowouts" where sections of the heap are shearing from the mother pile. There is the potential for a blowout to occur in which the collection stream is blocked subsequently causing the leachate solution to overflow out of the pad system.

3) INSUFFICIENT BERMS FOR STORM PROTECTION
The containment berms did not appear to be of the height as specified in the permit. This was further evidenced by the observation of two furrows leading from the containment berm

at the southeastern section of the pad. White residue was present on the soil of the southern most furrow indicating leachate solution had breached that berm sometime in the past.

We recommend that corrective action for each violation be as follows:

Violation 1) As discussed in the inter-office memo from Abigail Myers to Tim Levandowsky.

Violation 2) A.F. Budge Mining Ltd. should propose a plan by October 28, 1989 to remediate the slope of the heap.

Violation 3) A core sample of the soil immediately adjacent to the breached berm should be taken under department supervision and tested in an approved laboratory for free cyanide to determine the extent of the contamination. A.F. Budge Mining Ltd. should propose a plan by October 28, 1989, which includes calculations to support the design, to heighten the berms.

cc: Carole A. O'Brien, A.F. Budge Mining Ltd.
Larry Beal, Vulture Mine Properties Inc.
Dave Woodruff, Water Pollution Compliance Unit
Central Regional Office, ADEQ

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Inter-Office Memorandum

DATE: September 26, 1989

TO: Tim Levandowsky
Water Pollution Compliance Unit

THROUGH: Gary Ullinskey GMU
Roger Kennett RK
Water Permits Unit

FROM: Abigail Myers
Water Permits Unit

RE: Vulture Mine
Groundwater Quality Protection Permit No. G-0090-07

Gary Ullinskey, Mike Milczarek and I visited the Vulture Mine gold heap leaching facility on September 15, 1989. At that time we observed that a leak had occurred on the pad and cyanide leachate solution was being collected in the leak collection/detection system for the two western-most cells of the pad. A peristaltic pump had been installed on the eastern detection sampling point and Dave Allen, the production manager, indicated that nine gallons of leakage per day was being measured. The concentration of cyanide and pH of the fluid collected had been tested and exceeded the limits set in Part II.A.4. of the referenced permit.

Part II.C.1 of the Vulture Mine Groundwater Quality Protection Permit No. 0090-07 stipulates that if any fluid is collected in any of the leak detection sampling points and exceeds the limits set in part II.A.(4), appropriate action must be determined to mitigate the effects of the violation. Following are the recommendations of the Water Permits Unit.

The following should be done immediately.

1. Application of cyanide solution to the two cells which are exhibiting leakage should be halted.

2. All of the leaked leachate solution should be pumped from the leak collection system to the pregnant pond. Hydrostatic pressure on the secondary liner must be minimized to reduce the possibility of its failure. A second pump should be installed at the western leak detection sampling point that is not currently equipped. Pump intakes should be located as deeply as possible. The volume of the leaked leachate should be measured.

A plan and implementation schedule should be submitted no later than October 20, 1989 which at a minimum includes the means by which the following tasks will be accomplished.

1. Show the extent and magnitude of any contamination that may have occurred and how it will impact groundwater quality. Information on local groundwater flow direction should be included in the plan. Static water levels and water level elevations should be measured at each of the three wells in the vicinity and at the mine shaft. This information will be necessary in the event that additional monitoring locations are required.

2. Sample the leachate solution collected at the leak detection point and the groundwater at the on-site process water well. Analyses must be conducted for pH, total Cyanide, and dissolved Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver, and Mercury. Appropriate sampling techniques and EPA-approved analytical procedures by a certified laboratory must be used.

3. Locate the leak.

4. Remediate the leak and ensure that the facility will not discharge further and will be thus brought into compliance with the permit.

Additionally, the Quality Assurance data from the seam testing on the pad that was required in Part II.A.1.b. should be requested. This will aid us in determining the cause of the leak.

cc: Bob Hollander, CRO
Debra Daniel, Hydrology
Carole O'Brien, A.F. Budge Mining Ltd.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

EVAN MECHAM, GOVERNOR
GERALD H. TELETZKE, PH.D., DIRECTOR

June 14, 1988

Carole A. O'Brien
A.F. Budge Mining Limited
7340 E. Shoeman Lane
Suite 111 "B" (E)
Scottsdale, Arizona 85251-3335

Dear Sir:

Re: Groundwater Quality Protection Permit No. G-0090-07
Vulture Mine

Enclosed is a signed copy of the Groundwater Quality Protection Permit for the above referenced facility. This permit was developed pursuant to A.A.C. Title 9, Chapter 21, Arizona Groundwater Quality Standards; A.A.C. Title 9, Chapter 20, Article 2, Requirements for Facilities Affecting Groundwater Quality.

If you have any questions regarding this permit, please feel free to contact this office at 257-2270.

Sincerely,

Gerri Plain
Water Permits Unit
Office of Water Quality

cc: Compliance Unit
Robert Hollander (Central Regional Office)
County Health Department (Maricopa)
HS-Lab Licensure Prg. Mg.
Larry Beal, President Vulture Mine Properties, Inc.

STATE OF ARIZONA

GROUNDWATER QUALITY PROTECTION PERMIT

Part I. AUTHORIZATION FOR FACILITY OPERATION SUCH THAT GROUNDWATER QUALITY OF THE STATE OF ARIZONA IS NOT ADVERSELY IMPACTED.

In compliance with the provisions of A.R.S. 36-1851 et seq; A.A.C. Title 9, Chapter 20, Article 2; A.A.C. Title 9, Chapter 21, Article 4; and conditions set forth in this permit:

Facility Name: Vulture Mine

Owner: Vulture Mine Properties Inc.
Larry Beal, President
1414 E. Purdue
Phoenix, Arizona 85020

Operator: Carole A. O'Brien
A. F. Budge Mining Limited
7340 E. Shoeman Lane
Suite 111 "B" (E)
Scottsdale, Arizona 85251-3335

is authorized to operate the Vulture Mine-Heap Leaching facility located 12 miles Southwest of Wickenburg, Arizona in Maricopa County over groundwaters of the Phoenix Active Management Area in Township 6 North; Range 6 West; Section 36, SE 1/4 - Gila and Salt River Base Line and Meridian.

This permit shall become effective on the date of signature and shall be valid for the operational life of the facility provided that the facility is operated and maintained in compliance with the specific conditions, general conditions, and information documented or referenced in Parts I, II, III and IV of this Permit and such that groundwater quality standards are not violated (Part V).

Carole A. O'Brien
Carole A. O'Brien, Operator
A. F. Budge Mining Limited

Signed this 9th day of June 1988

Donald L. Miller, Ph.D., Assistant Director
Arizona Department of Environmental Quality

Signed this 27th day of May 1988

Part II. SPECIFIC CONDITIONS (R9-20-208.C.)

A. Containment/Disposal Requirements

1. Containment

The permittee is authorized to operate a hydrometallurgical precious metal recovery facility utilizing the cyanide heap leach process. Components of the operation shall include an agglomeration circuit, an impervious lined leach pad with solution collection ditches and containment berms, two impervious lined solution containment ponds (pregnant, barren), a product recovery circuit, and stormwater diversion ditches and berms. The facility shall be constructed and maintained in such a manner as to prevent discharge of pollutants to the land surface or subsurface which may have an adverse impact on groundwater.

a. Heap Leach Process

Material (ore) to be processed at the facility include 225,000 tons of existing on-site tailings. The tailings will be agglomerated with Portland cement prior to placement on the heap leach pad. The pelletized (agglomerated) material shall be placed on the lined leach pad. The heap will be constructed on the lined leach pad in three lifts, each of which will be twelve to fifteen feet in height, with a total heap height of approximately 45 feet. The cyanide solution application rate to the heap shall be approximately 0.004 gallons per minute per square foot, with a corresponding design solution flow rate of approximately 100 gpm.

b. Leach Pad Design with Leak Detection/Collection

The leach pad shall cover an area of approximately 180,000 square feet (4 acres) and shall be graded at a 1 percent slope from the toe of the pad (collection ditch) to a distance of 75 feet upslope edge of the pad. Prior to installation of the liner, the lining contractor shall inspect and verify the subgrade to be a continuous smooth surface free of protrusions of rock, nested gravels or other abrupt irregularities and that proper compaction has been achieved. The upper 6 inches of subgrade shall be compacted to a minimum of 95

percent of maximum dry density as determined by ASTM D698 method. A leak detection system consisting of a 30 mil HDPE underliner, a 16 ounce geotextile and a granual (sand and gravel) fill shall be placed underneath the primary liner at the west toe of the five segment berms which run parallel to the pad slope and divides the pad into five identical segments. The leak detection system shall have five sample access tubes (risers) booted through the primary liner at the toe of each pad segment to provide access for sampling of any leaking fluids. The leach pad primary liner shall consist of a 30-mil HDPE material and shall meet or exceed the National Sanitation Foundation minimum material properties (NSF Standard 54). Liner installation shall be supervised by a Lining Contractor which has more than five years experience or more than five million square feet of successfully installed flexible membrane lining. Destructive shear and peel test (ASTM D4545 6.1.2 and 6.1.1) shall be performed by an independent testing laboratory on field welds every 500 lineal feet of weld. The entire length of each field weld shall be tested by either vacuum methods or by electric arc testing.

c. Solution Storage Ponds with Leak Detection/Collection

The 40 mil HDPE lined solution collection channel located along the downslope toe of the leach pad shall transport pregnant solution and storm water runoff from the leach pad to the ponds. The V-shaped solution channel shall have a discharge capacity capable of handling the operating solution flow rate of 100 gpm with 1.8 foot of freeboard, and a stormwater discharge capacity in excess of 44,000 gpm without freeboard. Pregnant solution shall be directed from the channel down a spillway to the pregnant pond inlet. The pregnant pond shall have a total capacity of 1,000,000 gallons, which includes approximately 400,000 gallons reserved for stormwater flows. The pregnant pond shall have a reserved stormwater capacity capable of containing one-half the six-hour PMF (Probable Maximum Flood) (4.7 inches) which may fall on all lined areas. The barren solution storage pond will be approximately the same dimensions and capacity as the pregnant solution pond. The pregnant and barren pond liners shall be composed of three layers. First, a 20-mil HDPE underliner shall be covered by a layer of 16 ounce geotextile. The primary liner shall overlay the geotextile and shall be a 40-mil HDPE geomembrane. The bottom of both ponds shall be sloped to a lined leak

detection/collection sump where a PVC pipe shall be installed between the HDPE underliner and the HDPE primary liner extending through (booted) the primary liner at the crest elevation of each pond to provide access for the detection and sampling of any fluid leaks. Geomembrane liner installation and field seaming test as described for the heap pad liner installation shall be required for pond liner installations.

d. Product Recovery and Spill Containment

Precious metals contained in the leach solution shall be recovered in the extraction plant. Solution in the pregnant solution pond shall be pumped to the extraction plant and then into the barren solution storage pond. The extraction plant area shall be sloped to drain to the barren solution pond. The concrete floor of the extraction plant shall be designed to drain to a cement sump, piped to conduct flow to the barren solution pond. The cement structure and sump shall be capable of containing all solutions being processed within the extraction plant.

e. Tailings Disposal

The waste product (leach tailings) generated by the heap leach processing shall be rinsed and neutralized tailings contained on the impervious lined pad. The waste product shall not be removed from the lined pad and shall be stacked to prevent slumping and shall not allow discharge of any material or fluids to the land surface of subsurface.

f. Chemical Storage

Sodium cyanide used in the leaching process shall be stored in "air-tight" drums on wooden platforms underlain by a 40 mil HDPE liner which drains into the barren solution pond. A fresh water spray system shall be installed for washdown of the storage area and for triple rinsing empty cyanide containers. Empty chemical containers which have been triple rinsed shall be stored on-site until disposed of at an approved landfill site. All personnel shall be required to attend a cyanide safety and first-aid seminar offered on-site by the chemical supplier, or the State Mine Inspector. A stock of hypochlorite shall be maintained on-site for the purpose of neutralizing any cyanide in the unlikely event a spill occurs outside the areas of lined containment.

g. Sewage Disposal

Only temporary non-residential structures shall be built on-site to serve as an analytical laboratory, offices, and storage. Domestic sewage disposal shall be by means of portable toilets which shall be properly maintained with disposal of holding tank effluent at an approved location (landfill or wastewater treatment plant). All analytical samples shall be returned to the heap leach circuit so that no discard of leach solution samples to the land surface or subsurface shall be allowed.

h. Facility Protection

A surface water diversion system shall be constructed to prevent any runoff from a stormwater event from entering the processing site. Diversion of runoff from the upslope watershed shall be provided by a trapezoidal channel. The diversion channel shall be ten feet wide at the base with a height of approximately five feet with side slope having a 2 1/2:1 slope. The diversion shall have a discharge capacity of approximately 875 cfs approximately the equivalent of the 100-year, 24-hour storm event for the 4.4 square mile watershed. The channel surface shall be lined with shotcrete for erosion protection. A fence shall be constructed to enclose the leach pad, solution ponds, extraction plant, and chemical storage areas. The fence shall have lockable gates on all entrances and shall be posted as a restricted access area.

2. Unauthorized Materials

a. Adequate supervision and operation shall be performed to ensure that all users of the facility are aware of and understand the containment/ disposal requirements of Part II.A.

b. No commercial operations utilizing hazardous materials or creating hazardous wastes shall dispose of such materials into these systems.

3. Discharge Source Limits

a. There shall be no discharge of pollutants that violate the State of Arizona Groundwater Quality Standards (A.R.S. R9-21-401, et seq.).

b. The exhausted ore (waste product) shall not be removed from the lined heap leach pad.

c. Analytical sampling aliquots shall be returned to the heap leach solution circuit and shall not be disposed of on the land surface or subsurface.

4. Leak Detection Limits

Any fluid collected at the leak detection/collection sampling points shall not exceed a pH of 8.5 or show the presence of free cyanide above 0.20 mg/l.

5. Modification

This permit is issued contingent upon the above conditions. The permittee shall give ninety (90) days written advance notice to the Department of any modification to the above facility.

6. Other Laws and Rules

The operator must maintain compliance with all other State of Arizona laws and rules. The issuance of this permit does not waive any federal, state, county, or local government rules, regulations, or permits for which this facility may have to comply.

B. Monitoring Requirements, Record Keeping (R9-20-215)

1. Monitoring Type and Conditions

a. Leach Solution Monitoring

The leaching solution used in the hydromethallurgical heap leach process shall be closely monitored at least once daily in the form of a water balance. Representative samples will be taken daily from: Drainage from the heap leach pad into pregnant pond, leach solution entering and leaving barren ponds where chemicals (cyanide, lime) are added. All solutions sampled shall be analyzed by standard field methods for pH and cyanide (free) (EPA method 335.1). A log of these results, as well as daily solution levels in both barren and pregnant ponds, and the amount of fresh water added to leaching system daily shall be kept at the facility available for inspection by ADEQ personnel and shall be submitted to the Department in the form of a water balance along with the monitoring report as outlined in Part II.B.2.

b. Leak Detection and Collection Monitoring

The leak collection sampling point specified in Part II.A.1.b. and c. shall be monitored weekly for

the presence of fluid. Any fluid collected shall be analyzed by standard field methods for pH and free cyanide. Refer to contingency requirements (Part II.C.) for action to be taken if cyanide is detected.

2. Reporting Frequency

For daily and weekly field monitoring, including leak detection monitoring and water balance, obtained during the previous 3 months shall be summarized for each month and submitted quarterly in duplicate in accordance with the following schedule. The operator shall prepare a quarterly assessment report including the status of the operation, any remedial activities undertaken and analytical results for that quarter.

Monitoring results, water balance and assessment report for the previous quarter shall be postmarked no later than the 28th day of the month following the completed reporting period as follows:

Reporting Period	are due by
1st Quarter (Jan, Feb, Mar)	Apr 28
2nd Quarter (Apr, May, Jun)	Jul 28
3rd Quarter (Jul, Aug, Sep)	Oct 28
4th Quarter (Oct, Nov, Dec)	Jan 28

The results of all monitoring and reporting required by this permit shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this permit. All forms shall be sent to the following address:

Arizona Department of Environmental Quality
Office of Water Quality
Compliance Section
2005 North Central Avenue
Phoenix, Arizona 85004

C. Contingency Requirements (R9-20-206.D.2.)

1. Should any fluid be collected in any of the leak detection sampling points and exceed the limits of Section A.3., the permittee shall contact the Water Permits/U.S.T. Compliance Unit, adjacent landowners, and the Maricopa County Health Department within 72 hours to determine the appropriate action to mitigate the effects of the violation.

In the event of a spill, it shall be neutralized with a 10% hypochlorite solution stored on site to accommodate such or any other type of unforeseen situation. Any spill shall be reported in the quarterly assessment report.

D. Post-Closure Plan (R9-20-206.D.3. and R9-20-216.C.2.)

1. Before permanent abandonment of the facility site, the permittee shall adhere to the following procedures for closure when utilizing cyanide.

   a. Operate the leach solution circuit for a minimum of 96 hours without the addition of cyanide, only adding fresh water and caustic soda to maintain water levels and a pH of 10 to 11. Test the leach solution for any residual free cyanide. If free cyanide is detected in concentrations of greater than 0.2 mg/l, continue with next steps ("b." and "c." hypochlorite neutralization). If free cyanide is not detected in concentrations of greater than 0.2 mg/l, go to step "e.".

   b. Run a 1% hypochlorite solution through the pregnant pond and barren pond for a minimum of 24 hours.

   c. Run a 1% hypochlorite solution through the entire heap leaching system for a minimum of 48 hours.

   d. Test the rinseate for free cyanide as described in Part II.B.1.a. If free cyanide is detected in concentrations of greater than 0.2 mg/l, repeat steps "a." "b." and "c." above and test for cyanide again.

   e. Allow solutions to evaporate from the ponds. Any remaining residues or sludges shall be analyzed by EPA approved test methods (Test Methods for Evaluating Solid Waste, SW-846, 2nd Edition) for the following constituents, and the results reported to the Department.

Constituent	Limits
Cyanide (Total and Free)	10 mg/l
Arsenic	5 mg/l
Barium	100 mg/l
Cadmium	1 mg/l
Chromium	5 mg/l
Lead	5 mg/l
Selenium	1 mg/l
Silver	5 mg/l

If any constituent exceeds its associated limit, the residual sludge shall be removed and disposed of at a landfill approved for handling hazardous waste.

2. The permittee shall file a report with the Department's Water Permits Unit following closure describing the results of each step of the closure plan within 60 days after closure.

E. Compliance Schedule (R9-20-219)

No special requirements.

Part III. REFERENCES: PERTINENT INFORMATION

A. References

The terms and conditions set forth in this permit have been developed based upon the information contained in the following:

1. Groundwater Field Inspection Form(s) dated _____

2. Notice of Disposal dated 5/13/87

3. Groundwater Impact Review dated _____

4. Plan Review File Number N/A

5. Permit Application dated _____

6. Groundwater Impact Review dated _____

7. Amendments to 2 and 4 dated _____

8. Public Notice dated February 29, 1988

9. Public Hearing comments, correspondence letters, and any additional supplemental information contained in the facility permit file.

10. Other _____

B. Facility Information

1. Facility Contact Person Carole A. O'Brien, Operator

2. Address 7340 E. Shoeman Lane, Suite 111 "B" (E)
Scottsdale, Arizona 85251-3335

3. Emergency Telephone Number: Bus: (602) 945-4630
Home (602) 949-5015

The Department shall be notified within 30 days of a change in the facility contact person.

4. Landowner of Facility Site Vulture Mine Properties, Inc.
Larry Beal, President

C. Definitions

1. "Abandoned" means permanent cessation of facility operation, as determined by the facility owner. Facilities which are temporarily shut down are not considered abandoned within the context of these regulations.

2. "Activity" means any human activity including institutional, commercial, manufacturing, extraction, agricultural, or residential land use which may involve disposal of wastes or pollutants which may result in pollution of groundwaters of the State.

3. "Adverse impact upon groundwater quality" means any measurable change to the physical, chemical or biological character of groundwater caused by addition of pollutants or wastes.

4. "Approved" or "approval" means approved in writing by the Director.

5. "Aquifer" means a geologic unit that contains saturated permeable material to yield usable (drinking water, agriculture, industry, etc.) quantities of water to a well or spring.

6. "Composite sample" means a combination of 4 individual portions obtained at equal time intervals for 1 hour. The volume of each individual portion shall be directly proportional to the discharge flow rate at the time of sampling. The sampling period shall coincide with the period of maximum discharge flow.

7. "Department" means the Arizona Department of Environmental Quality (ADEQ).

8. "Director" means the Director of the Arizona Department of Environmental Quality or his duly authorized representative.

9. "Discharge" means the addition, spilling, leaking, pumping, pouring, emitting or dumping of any pollutant into waters of the State from any point source.

10. "Discharge Impact Area" means the potential area extent of waste or pollutant migration, as projected on the land surface, as a result of a discharge or disposal from a facility.

11. "Discrete sample" means any individual sample collected in less than 15 minutes.

12. "Disposal" means the discharge, deposit, well injection, dumping, spilling, leaking, or placing of any wastes or pollutants into or on any land or water such that groundwater is or may be affected. For the purposes of this Article, irrigation with effluent from a wastewater treatment facility is disposal if the application rate exceeds that amount necessary to satisfy the consumptive use and leaching requirements of the crop or landscaping being irrigated.

13. "Disposal system" means a system for disposing of wastes either by surface or underground methods and includes sewerage systems, treatment works, disposal wells and other systems.

14. "Facility" means any system or activity in which or by which disposal occurs or has occurred on either a continuous or intermittent basis.

15. "Flow rate" means the volume per unit time given to the flow of fluids.

16. "Geologic unit" means a geologic formation, group of formations, or part of a formation.

17. "Groundwater" means water under the surface of the earth regardless of the geologic structure in which it is standing or moving. Groundwater does not include water flowing in underground streams with ascertainable beds and banks.

18. "Groundwater Quality Standards" means the standards in A.A.C. R9-21-403.

19. "Hazardous waste" means a waste as defined by the Federal Resource Conservation and Recovery Act (P.L. 94-580).

20. "Hydraulic conductivity" means a measure of the capability of a geologic unit to transmit a fluid.

21. "Individual disposal system" means a device or system for the treatment or disposal of sewage from a single housing unit or equivalent.

22. "Maximum Disposal Limit (MDL)" means the maximum permissible level for a contaminant in an effluent stream.

23. "Maximum Groundwater Limit (MGL)" means the maximum permissible level for a contaminant in water.

24. "Modification" means a change in the location, volume, constituent(s) or constituent concentration(s) of a disposal which is described in the permit issued pursuant to R9-20-208.

25. "Operator" means any person who makes management decisions regarding facility operations.

26. "Owner" means any person holding legal or equitable title in any real property subject to these regulations.

27. "Permit" means a rule, certificate, letter, or any other document issued by the Director authorizing and conditioning the discharge of any pollutant to groundwater from any point source or disposal of wastes from any disposal system identified in A.R.S. Sec. 36-136.G.8.

28. "Pollute" means to cause pollution.

29. "Regulations" means A.A.C. Title 9, Chapter 20, Article 2, requirements for facilities affecting groundwater quality.

30. "Schedule of compliance" or "compliance schedule" means a written document issued by the Director which identifies requirements and times for compliance with either or both the water quality standards in A.A.C. Title 9, Chapter 21 or the permit regulations in A.A.C. Title 9, Chapter 20.

31. "Sewage" means wastes from toilets, baths, sinks, lavatories, laundries and other plumbing fixtures in residences, and wastes from institutions, commercial buildings, mobile homes and other places of human habitation, employment or recreation which are similar in content to residential wastes.

32. "Site" means the area where any facility is physically located or an activity is conducted, including adjacent land used in connection with the facility.

33. "Treatment works" means any plant or other works used for the purpose of treating, stabilizing, or holding wastes.

34. "Vadose zone" means the zone between the land surface and the principle zone of saturation.

Part IV. GENERAL CONDITIONS: RESPONSIBILITIES

A. Permit Duration (R9-20-210)

1. Permits shall be valid for the expected operational life of the facility under the ownership as set forth in the permit unless otherwise limited by Federal or State statute or transferred pursuant to R9-20-221.C.

2. A permit may be modified or terminated pursuant to R9-20-221.

3. The owner or operator of the facility may request that a permit be issued for a duration that is less than the full allowable term.

B. Permit Rights (R9-20-214)

1. A permit does not convey any property or water right of any sort, or any exclusive privilege.

2. A permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of Federal, State, or local laws or regulations.

C. Monitoring Requirements; Record Keeping (R9-20-215)

1. The permittee shall implement and maintain an approved monitoring system if required as a condition of a permit.

   a. The permittee shall install, use and maintain all monitoring equipment in acceptable condition or provide alternate methods approved by the Department.

   b. The permittee is required to conduct monitoring of a type and frequency sufficient to yield data which are representative of the monitored activity.

2. The permittee shall retain records or have access to all monitoring information, for a period of at least three (3) years from the date of the sample, or measurement. This period may be extended by written request of the Department at any time. Copies of records shall be furnished to the Department upon written request.

   a. Records of monitoring information shall include but are not limited to the following:

      (1) The date, time, exact place, and name of individual(s) who performed the sampling or measuring;

(2) the date(s) of, and name(s) of the individual(s) who performed the analyses; and

(3) the analytical techniques or methods used to perform the analyses.

b. Monitoring results shall be reported at intervals specified in the permit.

c. Calculations which require the averaging of measurements shall utilize an arithmetic mean unless it can be demonstrated by the permittee that another method would more accurately describe or be representative of the monitored activity.

3. Information submitted as a result of any well boring shall include a complete driller's log and drawings showing details of the well's construction. If information must be submitted more than once for the same well, then subsequent submittals shall note that the driller's log and construction drawings have already been submitted and the date of the initial submittal shall be documented.

D. Reporting Requirements (R9-20-216)

1. The permittee shall give ninety (90) days written advance notice to the Department of any modification to the facility which is not described in the approved Notice of Disposal or permit application.

2. The permittee shall notify the Department within seventy two (72) hours of becoming aware of any permit violation. The Department may require the permittee to submit a written report within thirty (30) days documenting the following:

a. A description of the noncompliance and its cause;

b. the period of noncompliance, including exact date(s) and time(s), and the anticipated time period during which the noncompliance is expected to continue if it has not been completely corrected;

c. action taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance: If applicable, such action shall be in accordance with an approved contingency plan;

d. monitoring or other information which indicates that any waste or pollutant may cause an endangerment to an aquifer; and

e. noncompliance with a permit condition, or malfunction of the disposal system which may cause fluid migration into or between aquifers.

3. The Department shall be notified in writing at least one hundred eighty (180) days prior to abandonment of the facility.

a. The permittee may be required to submit a detailed post-closure plan to the Department for approval which shall describe what the physical condition of the facility will be on the date operations are terminated.

b. The Department may require the post-closure plan to include any or all of the following:

(1) A description of monitoring procedures to be implemented by the permittee including monitoring frequency, type, and location which will be implemented to ensure post-closure activities will not violate groundwater quality standards;

(2) a description of procedures for maintaining existing groundwater quality protection systems;

(3) a schedule and description of physical inspections to be conducted at the facility following abandonment;

(4) a description of future land or water uses or both which may be precluded as a result of facility abandonment; and

(5) identification of responsibilities for post-closure cleanup or remedial action in the event of pollution of waters of the State.

E. Site Examination (R9-20-217)

1. The Department may routinely inspect the facility or an activity used for the generation, storage, treatment, collection, or disposal of any waste or pollutant, and where records are kept, for the purpose of determining compliance with these regulations or water quality standards, or verifying information submitted in a Notice of Disposal, or permit application, or documented in a permit including any permit conditions.

2. The Department may:

   a. Obtain samples of wastes or pollutants;

   b. analyze or cause to be analyzed any samples either on site or at another location;

   c. take photographs of waste and equipment processes and conditions at the site; or

   d. inspect and copy any pertinent records, reports, information, and test results.

3. Any pertinent information required by the permit to be maintained by the permittee shall be available for on-site inspection during normal business hours. Split samples and copies of photographs will be provided to the facility owner or operator if the owner or operator requests them at the time the sample(s) is obtained or the photograph(s) is taken as the case may be.

4. Inspections shall be conducted pursuant to the appropriate provisions of the Arizona Revised Statutes and policies established by the Department.

F. Proper Operation and Maintenance (R9-20-218)

The permittee shall at all times maintain in good working order and operate properly all treatment works installed or used for water pollution control and abatement to achieve compliance with the terms and conditions of the permit and water quality standards. If required by Article 5 of A.A.C. Title 9, Chapter 20, the permittee shall retain the services of an operator certified by the Department at the level appropriate to the permitted facility.

G. Permit Conditions (R9-20-220)

1. Duty to Mitigate

   The permittee shall take all steps to minimize and correct any adverse impact on groundwater quality as defined in A.A.C. Title 9, Chapters 20 and 21 resulting from noncompliance with the permit.

2. Duty to Reapply

   If a permittee has not been issued a permit for the life of the facility, a renewal application in the form of an amended Notice of Disposal or permit application shall be submitted to the Department no less than one hundred eighty (180) days prior to expiration of the existing permit.

3. Duty to Comply

The permittee shall comply with all terms and conditions of the permit, and take such action as is necessary to ensure compliance.

H. Permit Actions (R9-20-221)

1. This permit may be modified, transferred, renewed, or revoked for cause. The filing of a request by the permittee for a permit action does not stay any existing permit condition.

2. Permit Modification

a. Request for modification of a permit may be made by the permittee, the Department, or any affected person and shall identify the specific item(s) to be considered for modification.

b. Public requests for modification of a permit shall be in writing to the Department and shall contain technical facts or reasons which justify the requested changes. The Department upon receipt of the request will notify the permittee, and evaluate and determine whether any request for modification shall be granted.

c. The permittee may be required to submit additional information, including an updated Notice of Disposal or permit application.

d. Only those items considered for modification may be changed, and all other conditions of the existing permit will remain in effect.

e. The following circumstances and occurrences shall require modification of a permit:

(1) Modification to the facility, which justify application of permit conditions that are different from or absent in the existing permit;

(2) other information that was not available when the existing permit was issued, and which justifies application of different permit conditions;

(3) changes in the regulations or standards upon which the permit was based which have been made after the permit was issued;

(4) good cause exists for changes in a compliance schedule because of conditions over which the permittee has little or no control, and a change to the permit by modification is a reasonable remedy;

(5) reason(s) exists for revocation of the permit, and the Department determines that modification is an appropriate method for change; and

(6) amendment to an approved abandonment plan or contingency plan or any other portion of an approved Notice of Disposal or permit application.

f. The suitability of the location of the facility will not be reconsidered during the process of changing the permit unless new information or change to regulations indicate that a violation of adopted groundwater quality standards exist and no other action is possible to mitigate the violation and comply with groundwater quality standards.

g. The Department will publish a notice of intent pursuant to R9-20-223 to modify a permit before any final action is taken.

h. With the concurrence of the permittee, the Department may make minor modifications to a permit for any of the following reasons:

(1) To correct typographical errors;

(2) to require more or less frequent monitoring or reporting by the permittee;

(3) to change an interim compliance date in a schedule of compliance, provided the new date is not more than sixty (60) days after the date specified in the existing permit, and does not interfere with attainment of the final compliance date requirement;

(4) to change quantities or types of fluids discharged which are within the capacity of the facility as permitted, and in the judgment of the Department would not interfere with the operation of the facility or its ability to meet conditions prescribed in the permit, and would not change its classification, if the facility is an injection well; or

(5) to change construction requirements approved by the Department, provided that any such alteration shall comply with the requirements of these regulations.

3. Permit Transfer

a. This permit is transferrable to any person after thirty (30) days advance written notice to the Department. The Department may require modification of the permit to change the name of the permittee and incorporate any requirements which may be necessary to ensure compliance with State statutes and regulations.

b. The permittee shall notify by registered letter a new owner or operator of a permitted facility of the existence of the permit thirty (30) days prior to transfer of responsibility. The notice shall include a copy of the permit. A copy of the letter shall be transmitted to the Department.

c. The new owner or operator shall be responsible for compliance with the permit upon transfer of ownership or operation without regard to whether said owner or operator has in fact received the notice required by R9-20-221.C.2.

d. Permit transfer does not absolve the previous permittee of any liability existing at or before the time the permit was transferred.

4. Permit Revocation

a. Request for revocation of a permit may be made by the permittee, Department, or any affected person.

b. Public requests for permit revocation shall be in writing to the Department and shall contain technical facts or reasons which justify the requested action. The Department upon receipt of the request will notify the permittee and evaluate the request and determine whether any request for revocation should be granted.

c. Revocation of a permit is initiated when the Department issues a notice of intent to revoke a permit pursuant to R9-20-223 to the permittee and may be initiated for the following reasons:

(1) Noncompliance by the permittee with any permit condition;

(2) deliberate failure by the permittee to fully disclose all relevant facts when applying for a permit;

(3) intentional or deliberate misrepresentation of any relevant fact at any time by the permittee; or

(4) if it is determined by ADEQ that the permitted activity is causing a violation of groundwater quality standards and such violation can only be regulated to acceptable levels by revoking the permit.

d. If disposal to an aquifer causes a clear, present, and immediate danger to the health or welfare of persons, the Department may immediately suspend a permit. Within fourteen (14) days of the suspension, the Department shall issue a notice of intent to revoke the permit. The permit shall be considered revoked thirty (30) days after the notice of intent is issued by the Department unless and until a hearing is requested by the permittee pursuant to R9-20-222.

I. Confidentiality of Information (R9-20-224)

1. Any information submitted to or obtained by the Department pursuant to these regulations may be claimed as confidential by the facility owner or operator. Any such claim shall be asserted at the time the information is submitted or obtained. If no claim is made at that time, the Department may make the information available to the public without further notice.

2. Claims of confidentiality for the following information shall be denied:

a. The name and address of any permit applicant or permittee; or

b. information which deals with the present or future existence, absence, or level of waste(s) or pollutant(s) in water.

3. Criteria for determining confidentiality are:

a. A confidentiality claim has been made at the time the information was submitted or obtained;

b. the facility owner or operator has shown that reasonable measures have been taken to protect the confidentiality of the information, and intends to continue to take such measures;

c. the information is not, and has not been, reasonably obtainable without the facility owner or operator's consent;

d. no statute specifically requires disclosure of the information; and

e. the facility owner or operator has shown that disclosure of the information is likely to cause harm to it's competitive position; or, the information is voluntarily submitted and disclosure would be likely to impair the State's ability to obtain necessary information in the future.

J. Enforcement and Penalties (R9-20-225)

Any person who constructs, operates, or maintains a facility, disposal system, or introduces wastes or pollutants to waters of the State contrary to the provisions of this permit, falsifies data or information submitted to the Department as a result of the requirements of this permit, or otherwise violates the provisions of this permit, shall be subject to enforcement and penalties pursuant but not limited to A.R.S. 36-1864.01.

PART V. GROUNDWATER QUALITY STANDARDS

A. General Standards Applicable to all Groundwaters (R9-21-403)

1. Discharges of any pollutants and disposal of any wastes shall not impair the uses which have been made, are being made, or will be made of groundwater for every purpose.

2. Discharges of any pollutants and disposal of any wastes to groundwaters of the State shall not cause a public health hazard.

3. Disposal of any hazardous waste, radioactive waste or other waste shall not cause toxic substances to be present in groundwaters of the State in concentrations which are or may be hazardous to public health or which interfere with present and future uses of the groundwater.

4. Discharges of any pollutants and disposal of any wastes to groundwaters of the State shall not directly or indirectly cause violation of surface water quality standards established pursuant to Article 2 of this chapter.